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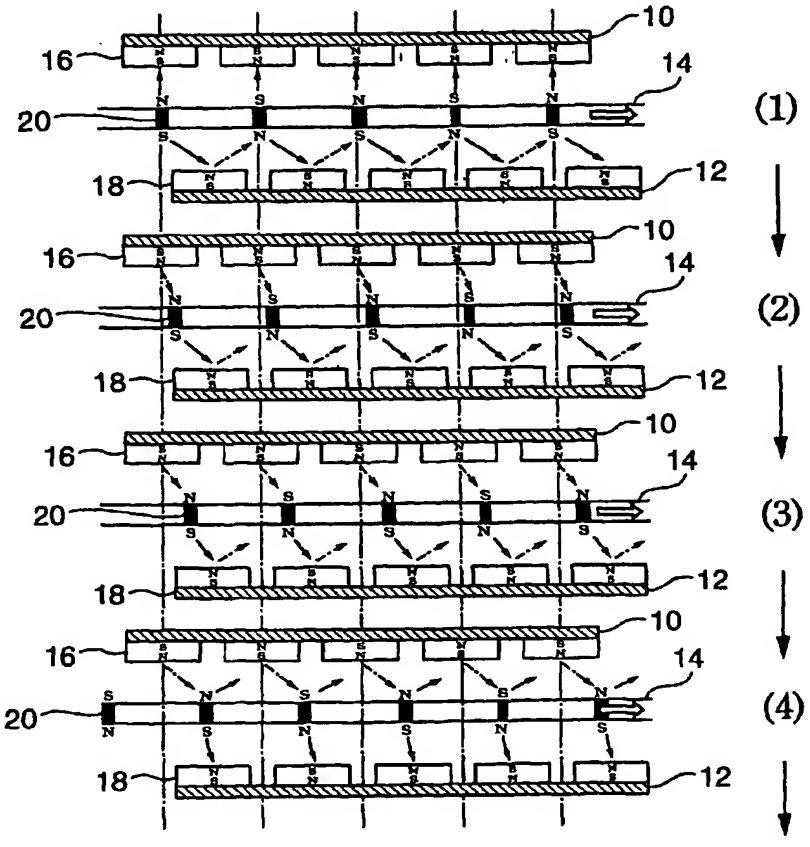
(54) Title: MAGNETIC STRUCTURE AND MOTOR EMPLOYING SAID MAGNETIC STRUCTURE, AND DRIVER COMPRISING SAID MOTOR



(57) Abstract: Provided is a small motor superior in weight/torque balance. A phase stator 10 and B phase stator 12 are disposed to face each other. A rotor is interpositioned between these stators. Electromagnetic coils @are provided to the stators evenly in the circumferential direction. A permanent magnet is provided to the rotor evenly in the circumferential direction. The exciting polarity of the electromagnetic coil is alternately opposite, and this is the same for the permanent magnet. A signal having a prescribed frequency is input to the A phase electromagnetic coil and B phase electromagnetic coil. The rotor rotates between the stators as a result thereof.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Claims

[Received by the International Bureau on 03 March 2005 (03.03.05): original claims 1, 5, 9, 21 and 23 are amended, original claims 2-4, 8, 12, 13-17, 19, 20, 22, 24, 25, 27, 29 and 30 are cancelled, the remaining claims are retained unchanged. (8 pages)]

1. (Amended) A magnetic structure comprising a first magnetic bodies and a second magnetic body, and a third magnetic body disposed therebetween and relatively movable in a prescribed direction in relation to said first and second magnetic bodies,

wherein said first magnetic body and second magnetic body respectively comprise a structure in which a plurality of electromagnetic coils capable of being alternately excited to opposite polarities is disposed in order; said third magnetic body comprises a structure in which permanent magnets alternately magnetized to opposite polarities are disposed in order; and said first magnetic body and said second magnetic body are structured such that an electromagnetic coil of said first magnetic body and an electromagnetic coil of said second magnetic body are disposed so as to mutually posses an array pitch difference,

said magnetic structure further comprising a coil exciting circuit for supplying an exciting current, consisting of frequency signals having different phases,

to the electromagnetic coils of said first and second magnetic bodies,

wherein the pair formed from said first and second magnetic bodies and one side of said third magnetic body form a rotor, and the pair formed from said first and second magnetic bodies and the other side of said third magnetic body form a stator, and

wherein said coil exciting circuit controls excitation of the electromagnetic coils of said first and second magnetic body via the exciting current supplied to the electromagnetic coils, the phase of the current being corrected based on a rotational speed of said rotor.

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Amended) A magnetic structure according to any one of claims 1, wherein said first magnetic body, second magnetic body and third magnetic body are respectively formed in a circular arc.

6. A magnetic structure according to any one of claims 1 or 5, wherein said first magnetic body, second magnetic

body and third magnetic body are respectively formed in a straight line.

7. A magnetic structure according to claim 5 or claim 6, wherein said first magnetic body and second magnetic body are disposed at an equidistance, and said third magnetic body is disposed between said first magnetic body and second magnetic body.

8. (Cancelled)

9. (Amended) A motor according to claim 1, further comprising a rotational speed detection means of said rotor.

10. A motor according to claim 9, wherein said exciting circuit means comprises reference pulse signal generation means; and phase correction means for correcting the phase of the exciting current to be supplied to the electromagnetic coil of said first magnetic body and the electromagnetic coil of said second magnetic body based on said rotational speed detection signal and said reference pulse signal.

11. A motor according to claim 10, wherein said exciting circuit means comprises buffer means for controlling the exciting direction of said electromagnetic coil at a

prescribed duty ratio upon the phase-corrected exciting current being supplied thereto.

12. (Cancelled)

13. A motor comprising the magnetic structure according to any one of claims 1 to 7, wherein the pair formed from said first and second magnetic bodies and one side of said third magnetic body form a slider, and the pair formed from said first and second magnetic bodies and the other side of said third magnetic body form a stator.

14. A motor according to any one of claims 8 to 12, wherein a gear is formed on said rotor.

15. A motor according to any one of claims 8 to 12, wherein said rotor is connected to a rotating body, and functions as a power generator.

16. A motor according to any one of claims 8 to 12, wherein a plurality of pairs formed from said stator and rotor is connected serially or in parallel.

17. A driver comprising the motor according to any one of claims 8 to 12 as a drive source.

18. A motor comprising a stator and a rotor, wherein a gear is formed on said rotor or stator.

19. (Cancelled)

20. (Cancelled)

21. (Amended) A driving method of a magnetic body, wherein a third magnetic body is interpositioned between a first magnetic body and a second magnetic body, the respective magnetic bodies comprise a plurality of magnetic units capable of being alternately magnetized to opposite poles, and said first magnetic body and second magnetic body, and said third magnetic body may be moved relatively by periodically changing the magnetic pattern pertaining to the magnetic unit of at least one magnetic body, wherein the magnetic circuit in relation to said magnetic body is structured in an open loop.

22. (Cancelled)

23. (Amended) A magnetic structure according to claim 1 , wherein aid exciting circuit comprises a start-up control unit for generating a reference wave pulse and forming an exciting signal to be supplied to said magnetic body from said reference wave pulse in order to start-up said first and/or second magnetic body; and a sensor follow-up control unit for forming an exciting signal to be supplied to said magnetic body by following the output from the

rotational position sensor of said magnetic body after the start-up of said magnetic body.

24. (Cancelled)

25. (Cancelled)

26. A magnetic structure according to claims 1, wherein every exciting coil is constantly excited during the start-up rotation (2π) in relation to the two-phase exciting coil.

27. A magnetic structure according to claim 2, wherein the duty ratio of the signal to be supplied from said exciting circuit means to the electromagnetic coil of said first and/or second magnetic body is made to change.

28. A magnetic structure according to claim 27, wherein said duty ratio is determined in accordance with the driving state of the load driven with said magnetic structure.

29. (Cancelled)

30. (Cancelled)

31. A magnetic structure according to claim 1, wherein said first and second magnetic structures are structured from an electromagnetic coil formed in a coil shape by winding a conducting sleeve around a nonmagnetic bobbin.

32. A magnetic structure according to claim 31, wherein a magnetic body is driven via switching of attraction and repulsion between third magnetic bodies formed from said electromagnetic coil and a permanent magnet.

33. A magnetic structure according to claim 31, wherein said first and second magnetic bodies are structured from a magnetic stator formed from a nonmagnetic bobbin.

34. A magnetic drive mechanism, comprising an electromagnetic coil having formed thereon a nonmagnetic conductive pattern and a permanent magnet; means for supplying exciting current to said electromagnetic coil; and switching means for switching the attraction and repulsion between said electromagnetic coil and permanent magnet.

35. A mechanism according to claim 34, wherein a magnetic field in the horizontal direction is formed in said electromagnetic coil and permanent magnet.

36. A magnetic drive-power generation mechanism for rotating a rotor in relation to a stator by utilizing the attraction and repulsion between the electromagnetic coil and permanent magnet, wherein the magnetic field is formed parallel to the rotating direction of the rotor.

37. A magnetic drive-power generation mechanism according to claim 36, wherein said stator and rotor are formed in a disc shape.

38. A magnetic body formed such that a plurality of electromagnetic coils or permanent magnets is alternately disposed so as to be opposite poles on a disc.

39. A magnetic body according to claim 38, wherein said disc is formed from a nonmagnetic material.